

PRESSURE VESSEL
API 510 IN SERVICE INSPECTION REPORT



AMERICAS STYRENICS, LLC

VESSEL NO. T-599

TORRANCE FACILITY

TORRANCE, CA

JULY 21, 2017



Prepared by:

HMT Inspection
A Division of HMT Inc.
4075 E. La Palma Avenue, Suite M
Anaheim, CA 92807-1725
714.632.7821

INTRODUCTION

HMT Inspection, a division of HMT LLC, provided on-site inspection services in accordance with API Standard 510 guidelines for pressure vessels to establish the current condition of Vessel No. T-599 at the Americas Styrenics, LLC Torrance Facility in Torrance, CA.

This report is being provided to document these inspection findings based on the inspections performed and to summarize the evaluation of the vessel assessment in accordance with the guidelines of API 510 as applicable.

The owner / user is ultimately responsible for establishing the final suitability for service of Vessel No. T-599 using the current condition of this tank as detailed herein and the decisions made by the owner / user in satisfying API 510 guidelines for continued operation / repair / alteration / modification as appropriate, subject to the following conditions being met:

1. That the owner / user review, evaluate and implement the recommendations set forth in Section 2.0, Summary and Repair Recommendations, of this report or, the owner / user determines that no action(s) need be taken prior to continued service and such decision(s) are documented in the vessel historical record file.

HMT Inspection provided the following personnel:



Ken Strange
API 510 Aboveground Storage Tank Inspector
Certification Number: 49887
Level II Technician

Fernando Rodriguez
Technician

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1.0 DESCRIPTION

GENERAL:

VESSEL NO.:	T-599
DATE OF INSPECTION:	July 21, 2017
OWNER:	Americas Styrenics L.L.C.
DESIGN STANDARD:	ASME Sect. VIII, Div. 1, 1989
VESSEL LOCATION:	Torrance, CA
MANUFACTURER:	Alameda Tank Company
MATERIALS:	
HEADS:	SA-240 Type 316L Stainless Steel
SHELL:	SA-240 Type 316L Stainless Steel
SERVICE / PROCESS:	Train 5 Styrene Service
NAME PLATE PRESENT:	Yes
MFRS. SERIAL NO.:	3435
NATIONAL BOARD NO.:	624
OPERATING PRESSURE:	Atmospheric
MAX. ALLOW. WORKING PRESS. (MAWP):	78 PSI @ 450° F
MFRS. DATA REPORT ON FILE:	Yes

DIMENSIONS:

DIAMETER:	8 ft. 0 in.
HEIGHT:	9 ft. 9 in.
NOMINAL SHELL THICKNESS:	0.3125 in.
NOMINAL HEAD THICKNESS:	0.3125 in.

GEOMETRY:

FOUNDATION:	Structural Steel Supports
VESSEL ORIENTATION:	Vertical
HEAD TYPE:	2:1 Ellipsoidal
CIRCUMFERENTIAL WELDS:	Butt Welded
LONGITUDINAL WELDS:	Butt Welded
JOINT EFFICIENCY:	
HEADS: 100%	
SHELL: 85%	

DATES:

YEAR BUILT:	1992
LAST COATED:	N/A
LAST INSPECTION:	July 12, 2012

ACCESS:

STAIRWAY:	Structural Framing
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2.0 INSPECTION SUMMARY

The following is a summary of the significant findings of the inspection.

JOB DESCRIPTION: The vessel was inspected for the purpose of detecting defects in the shell, heads, and nozzle appurtenances. Visual (VT) inspection was performed and covered the external surfaces (limited due to the presence of external insulation). Manual Ultrasonic (UT) techniques were utilized to obtain material thickness data at random Corrosion Monitoring Locations (CMLs) at the insulation access ports as shown on the attached Layout Drawing.

HISTORY: This is the 4th inspection of this vessel performed by HMT Inspection. Prior external inspection was conducted in 2012.

EXTERNAL INSPECTION FINDINGS: Visual (VT) inspection found no severe abnormal conditions existing on the exterior vessel surfaces (which was limited due to the presence of external insulation). Ultrasonic (UT) thickness measurements obtained at the CML points detected no active degradation of the surfaces inspected.

Foundations / Supports: The vessel sits vertically supported by structural steel that is anchored to concrete pedestals. These steel supports and concrete pedestals are in acceptable condition.

Insulation / Coating: This vessel is covered externally with insulation. This insulation is in acceptable condition with no defects present.

Shell: Where visible (through insulation CML ports) the shell appears to be in acceptable condition.

Heads: Where visible (through insulation CML ports) both heads appears to be in acceptable condition. There are areas of bird droppings on the top head that should be properly removed at the next available opportunity.

Nozzles: Where visible, the nozzles appear to be in acceptable condition. Several nozzles and valves did have light surface rust present that should be properly cleaned and re-coated at the next available opportunity.

Gasket Surfaces: No gasket surfaces were inspected at this time.

Pressure Relief Device: There is one (1) 2-inch x 3-inch PRV that is set at 65.0 psi.

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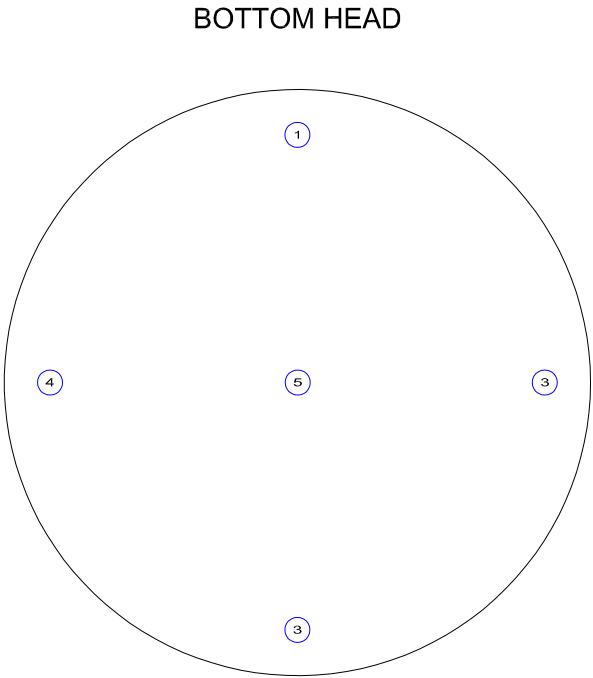
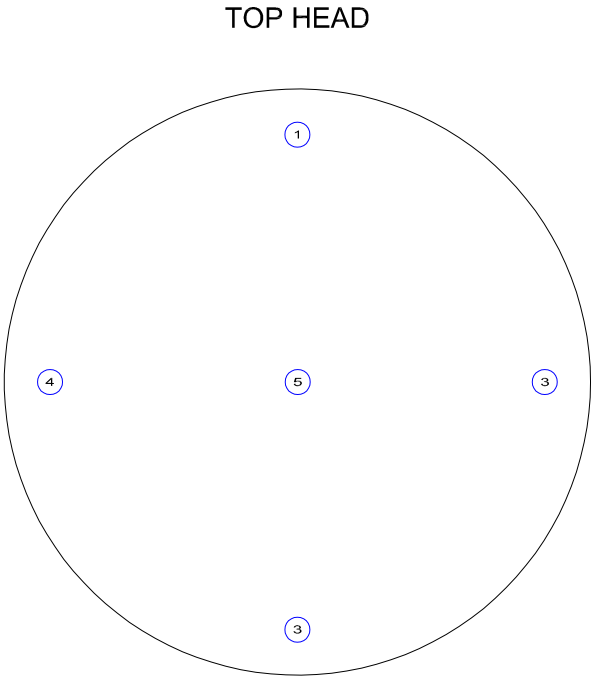
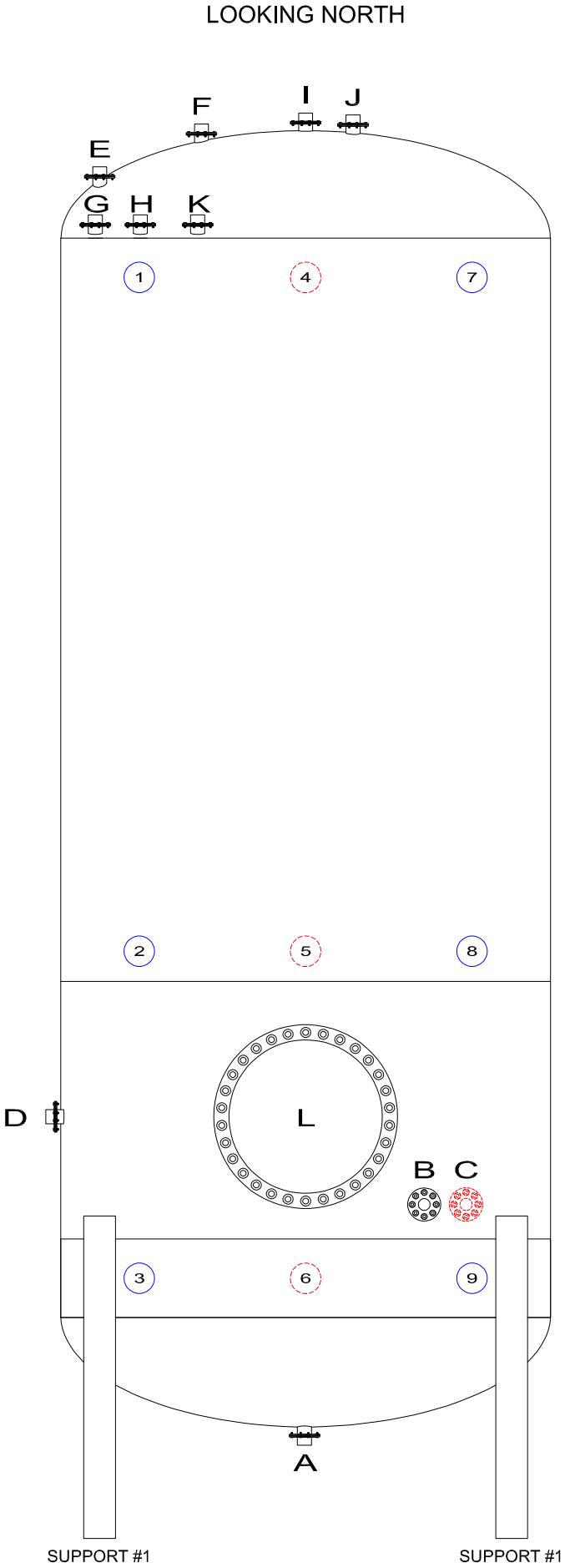


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INSPECTION SUMMARY:

Recommendations: Based on recent operating history, age of this vessel and results of this inspection, no changes in current operating practices are recommended at this time. Current operating temperature and pressure limits can be maintained until further inspection is completed. In-service (external) inspection should be conducted at 5-year intervals.

The next external API 510 inspection should be conducted within 5 years and no later than July 2022.



DRAWING NOT TO SCALE

NOZZLES

A = 4" NOZZLE
B = 3" NOZZLE
C = 3" NOZZLE
D = 1.5" NOZZLE
E = 4" NOZZLE
F = 3" NOZZLE
G = 1" NOZZLE
H = 3" NOZZLE
I = 2" NOZZLE
J = 2" NOZZLE
K = 3" NOZZLE
L = 24" MANWAY

GENERAL

PROGRAM NAME : AUTO CAD LT.
LAYER NOZZLES = NOZZLES
LAYER INDICATIONS = INDICATIONS

Y X REFERENCE CORNER

LEGEND

⊕ ⊖ = UT LOCATION



HMT INSPECTION
4075 E. La Palma Ave. Ste. M
ANAHEIM, CA. 92807

TITLE:
VESSEL LAYOUT

OWNER:
AMERICAS STYRENICS

TANK NO:
T-599

JOB NO:
23263832

DRAWN BY:
C.M.R

DATE:
12 JUL 2012

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4.0 INSPECTION REPORT

4.1 EXTERNAL INSPECTION CHECKLIST

✓		DESCRIPTION	COMMENTS
Y	1	Inspect foundation for damage.	Acceptable
Y	2	Search for indications of leakage.	None found, Acceptable
Y	3	Inspect for cavities and vegetation around foundation.	Acceptable
Y	4	Check for proper water runoff and drainage away from the foundation.	Acceptable
N	5	Check for settlement around the foundation for the vessel.	N/A
Y	6	Inspect vessel anchor bolts (if present).	Acceptable
N	7	Inspect for coating failure, pitting, and corrosion.	N/A
Y	8	Inspect entire vessel surface (shell and heads) for leaks or corrosion.	Acceptable
Y	9	Inspect vessel insulation (if present) note condition and damage (if any).	Reference Section 2.0
Y	10	Check support welds to vessel for corrosion or defects.	Acceptable
Y	11	Conduct Visual inspection of entire vessel (shell and heads) for bulges or deformation.	Acceptable
Y	12	Check piping, valves flanges and bolting for leaks or signs of damage.	Acceptable
Y	13	Inspect for signs of corrosion or other defects around all manways, nozzles, and attachments.	Reference Section 2.0
Y	14	Inspect all pressure relieving devices and record data on vessel nozzle table.	Reference Section 2.0
Y	15	Conduct Ultrasonic Thickness readings of entire vessel (shell and heads). Record all data.	Reference Table A
Y	16	Inspect vessel access structures, ladders, stairway, cages and handrails.	Acceptable

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4.1.1 VESSEL NOZZLE TABLE

Item	Description	Pipe Size (in.)	Location	Neck Thick (in.)	Comments
A	Nozzle	4.0	Bottom Head	--	No Inspection Port
B	Nozzle	3.0	Shell	0.225	
C	Nozzle	3.0	Shell	0.228	
D	Nozzle	1.5	Shell	0.158	
E	Nozzle	4.0	Top Head	--	
F	Nozzle	3.0	Top Head	--	Not Able to Reach
G	Nozzle	1.0	Top Head	--	
H	Nozzle	3.0	Top Head	--	
I	Nozzle	2.0	Top Head	--	Not Able to Reach
J	Nozzle	2.0	Top Head	--	Not Able to Reach
K	Nozzle	3.0	Top Head	--	
L	Manway	24.0	Shell	0.360	

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5.0 NDT INSPECTION

5.1 NDT INSPECTION SCOPE

The following Nondestructive Testing (NDT) was conducted to evaluate the physical characteristics of the tank:

- A) Visual Inspection (VT) of areas for the detection of anomalies or significant metal loss which may affect the integrity. Performed in accordance with HMT Inspection VT Procedure No. 1611.9, Revision No. 3.
- B) Random Ultrasonic (UT) shell / head readings. Performed in accordance with HMT UT Procedure No. 1611.1, Revision No. 5.

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6.0 EQUIPMENT

6.1 ULTRASONIC

UT equipment utilized for the inspection was a Krautkramer Branson USM-35 Flaw Detector and a Panametrics EPOCH LT Flaw Detector.

Transducer equipment utilized was a high temperature Panametrics, 5.0 MHz, 0.312 inch dual element.

Echogel 20 was used as a couplant.

Calibration block equipment utilized was a 5 step, 4340 steel test block.

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7.0 TABLES

**TABLE A
VESSEL CML READINGS
(in inches)**

Location	2007 Readings	2012 Readings	2017 Readings
1	0.351	0.337	--
2	0.350	0.342	0.342
3	0.350	0.346	0.335
4	0.355	0.375	--
5	0.351	0.336	0.350
6	0.347	0.350	0.340
7	0.349	0.357	--
8	0.345	0.336	0.338
9	0.349	0.345	0.350

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**TABLE B
TOP HEAD CML READINGS
(in inches)**

Location	2007 Readings	2012 Readings	2017 Readings
1	0.400	*	*
2	0.399	0.376	*
3	--	--	*
4	0.399	0.370	*
5	--	--	*

* Not able to get reading.

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TABLE C
BOTTOM HEAD CML READINGS
(in inches)

Location	2007 Readings	2012 Readings	2017 Readings
1	0.399	0.394	0.387
2	0.400	0.386	0.390
3	--	--	--
4	0.405	0.421	0.420
5	0.399	0.367	0.360

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8.0 WARRANTY

WARRANTY

HMT Inspection, a division of HMT LLC ("HMT") has evaluated the condition of this vessel based on the observations and measurements made by the HMT Inspection Inspector. While our evaluation accurately describes the condition of the vessel at the time of inspection, the vessel owner / operator must independently assess the inspection information / report provided by HMT Inspection and any conclusions reached by the vessel owner / operator and any action taken or omitted to be taken are the sole responsibility of the owner / operator. With respect to inspection and testing, HMT Inspection warrants only that the services have been performed in accordance with accepted industry practice. If any such services fail to meet the foregoing warranty, HMT Inspection shall re-perform the service to the same extent and on the same conditions as the original service.

The preceding paragraph sets forth the exclusive remedy for claims based on failure or of defect in materials or services, whether such claim is made in contract or tort (including negligence) and however instituted, and, upon expiration of the warranty period, all such liability shall terminate. The foregoing warranty is exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE SHALL APPLY**, nor shall HMT Inspection be liable for any loss or damage whatsoever by reason of its failure to discover, report, repair or modify latent defects or defects inherent in the design of any vessel inspected. In no event, whether a result of breach of contract, warranty or tort (including negligence) shall HMT Inspection be liable for any consequential or incidental damages including, but not limited to, loss of profit or revenues, loss of use of equipment tested or services by HMT Inspection or any associated damage to facilities, down-time costs or claims of other damages.



Vessel Stand-Off



Vessel Stand-Off



PRV



PRV



PRV Tag



Top Head

9.0 PHOTOGRAPHS



Top Head



Top Head Nozzle



Top Head nozzles



Manway



Bottom Head



Bottom Head



Support Footing



Grounding



Nozzle



AMERICAN PETROLEUM INSTITUTE
Individual Certification Programs: ICP™

API Individual Certification Programs

certifies that

Kenneth S. Strange

has met the requirements to be a certified

API-510 Pressure Vessel Inspector

Certification Number *49877*

Original Certification Date *November 30, 2013*

Current Certification Date *November 30, 2016*

Expiration Date *November 30, 2019*

Tina Briskin

Manager, Individual Certification Programs



This is a copy, the original has gold foil typeset. To verify authenticity please go to <http://myicp.api.org/inspectorsearch/> and follow instructions to verify inspectors' status.

Certificate of Qualification



INSPECTION

This is to Certify

Kenneth S. Strange

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2011 ed.

<u>Method</u>	<u>Level</u>	<u>Expiration Date</u>
API 653	No. 31081	04/30/2019
API 510	No. 49877	11/30/2019
API 570	No. 32170	12/31/2019

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

February 3, 2017
Date